Patent Claims

1. Method for producing an anisotropic magnetic powder, in which
- a with a starting material based on an SE-TM-B alloy, where SE is a rare earth element including yttrium and TM is a transition metal,
- a mixture having a $TM_xB$ phase, in particular $Fe_2B$ phase is produced by a first hydrogenation process (S4) with heating under a hydrogen pressure to produce a hybrid and by a second hydrogenation process (S5) to produce a phase transition which takes place under a hydrogen pressure and an elevated temperature that induces a phase transition and
- a dehydrogenation process with a reverse phase transition (HDDR method) (S6) is performed,
characterized in that
- a magnetic material with an anisotropic orientation is used as the starting material.

2. Method for producing an anisotropic magnetic powder, in which
- with a starting material based on an SE-TM-B alloy, where SE is a rare earth element including yttrium and TM is a transition metal,
- a mixture having a $TM_xB$ phase, in particular an $Fe_2B$ phase is produced by a first hydrogenation process (S4) with heating under a hydrogenation pressure to create a hybrid and by a second hydrogenation process (S5) to induce a phase transition which takes place under a hydrogenation pressure and at an elevated temperature which induces a phase transition and
- a dehydrogenation process with a reverse phase transition (HDDR method) (S6) is performed,
- whereby the starting as a magnetic material consists at least partially of magnetic scrap metal.

3. Method according to Claim 1 or 2, in which a permanent magnetic material with a hard magnetic phase $SE_2TM_{14}B$ is used as the magnetic material, where SE is a rare earth element including Y and TM is a transition metal.

4. Method according to Claim 1, 2 or 3, in which at least one of the elements Fe, Ni or Co is provided as the transition metal.

5. Method according to a preceding claim, in which additives including amounts of C, O, N and/or S are present.

6. Method according to a preceding claim, in which a magnetic material with an average grain size of less than 1 mm, a hard magnetic content greater than 90% by volume and/or foreign phases smaller than 0.5 mm in size is used as the starting material.

7. Method according to a preceding claim, in which a magnetic material with an average grain size smaller than 0.1 mm is used as the starting material.

8. Method according to a preceding claim, in which the starting material is ground and screened or fractionated before the hydrogenation/dehydrogenation treatment (S3).

9. Method according to a preceding claim, in which a magnetic powder with a crystal size amounting to at most 75% of the particle size (S3) is selected as the starting material.

10. Method according to a preceding claim, in which the starting material is cleaned, especially removing foreign phase fractions (S3).

11. Method according to a preceding claim, in which the starting material is cleaned by annealing *in vacuo*, in a noble gas or in hydrogen before the hydrogenation/dehydrogenation treatment (S3).

12. Method according to a preceding claim, in which a heat treatment is performed in particular at a temperature up to 600°C under a noble gas or a vacuum atmosphere after the hydrogenation/dehydrogenation treatment.

13. Method according to a preceding claim, in which the magnetic powder that is produced is homogenized by (S8).

14. Method according to a preceding claim, in which the magnetic powder produced is freed of a coarse fraction greater than 0.5 mm in size by screening.

15. Method according to a preceding claim, in which the magnetic powder is supplied with a particle fraction of max. 10% particles <32 μm in size.

16. Method according to a preceding claim, in which the magnetic powder is coated (S9).

17. Method according to a preceding claim, wherein B is partially replaced by C.

18. Plastic or metal bonded magnet manufactured using a metal powder produced by a method according to a preceding claim.

19. Magnet according to Claim 18, with an energy product BHmax greater than 80 $kJ/m^3$.

20. Magnet according to Claim 18 or 19, with a degree of orientation equal to or greater than 70%.

21. Magnet according to Claim 18, 19 or 20, with a degree of filling of magnetic fractions of at least 63 vol%.